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<p>In a communication system one of the primary concerns is maximum efficiency in signal transmission and reception. For maximum power transfer there must be an impedance match between the antenna and transmitter (or receiver). A basic problem is to design a coupling network between a given source and a given load so that the transfer of power from the source to the load is maximized over a given frequency band of interest. The device used to perform this impedance matching is called an antenna matching network.</p> <p>The number of pieces of equipment requiring an antenna connection in some applications may exceed the number of acceptable locations available for antennas. One solution is the use of broadband antennas that have a low VSWR (voltage standing-wave ratio) over the operating band. Broadband antennas are used in conjunction with multicouplers (filters with multiple inputs) to provide a sufficient number of antenna connections.</p> <p>Despite the aid of Smith Charts, the traditional design of an antenna matching network by engineering experience and manual calculation means is an extremely time-consuming task. This paper is intended to relieve the engineer of the tedious numerical calculation involved in the network design.</p> <p>An interactive BASIC language computer program to aid in the design of a matching network for a broadband antenna is described (S.T. Li and D.W.S. Tam, NOSC TD 1148, September 1987). Guidelines for the design of a broadband matching network are presented. The Antenna Matching (ANTMAT) program provides a computer-aided design tool for determining network topology and component values of the networks. It improves the speed and accuracy of the broadband matching network design procedures. An optimization algorithm finds the values of the components that minimize the input reflection coefficient. At first, the optimization algorithm with an exponential weighting function is employed for determining a list of network candidates (either a pi network or a T network) from which a network topology is selected. After a topology is specified, the optimization algorithm with other weighting functions is used for finding optimum element values.</p> <p>Presented at the Fourth Annual Review of Progress in Applied Computational Electromagnetics, 22-24 March 1988, Monterey, CA.</p>			
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22a. NAME OF RESPONSIBLE INDIVIDUAL S.T. Li		22b. TELEPHONE (include Area Code) (619) 553-5089	
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THE DESIGN OF ANTENNA MATCHING NETWORKS USING A MICROCOMPUTER

S. T. Li and D. W. S. Tam
Naval Ocean Systems Center, Code 822
271 Catalina Blvd.
San Diego, California 92152-5000

In a communication system one of the primary concerns is maximum efficiency in signal transmission and reception. For maximum power transfer there must be an impedance match between the antenna and transmitter (or receiver). A basic problem is to design a coupling network between a given source and a given load so that the transfer of power from the source to the load is maximized over a given frequency band of interest. The device used to perform this impedance matching is called an antenna matching network.

The number of pieces of equipment requiring an antenna connection in some applications may exceed the number of acceptable locations available for antennas. One solution is the use of broadband antennas that have a low VSWR (voltage standing-wave ratio) over the operating band. Broadband antennas are used in conjunction with multicouplers (filters with multiple inputs) to provide a sufficient number of antenna connections.

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